TABLE I. DEVICE PARAMETERS 1/

JPL PART NO. ST12117-	MFR	MFR PART NO. REF.	COIL VOLTAGE	DC COIL RESISTANCE AT 25°C (Ω ±10%)	DROPOUT VOLTAGE (MAX)	OPERATE/RELEASE TIME (MS MAX)	CASE 5/	CIRCUIT DIAGRAM 2/	SCREENING 3/ 4/	ELECT. TEST	DELTA LIMITS 3/	LOT QCI REQMNTS 3/
K412V05PN	TEL	412V-0621	+0.8 5.0V -0.9	50	2.3V	3.0/2.0	FIG. 1 (TO-5)	FIG. 1	TABLE V PARA. 4.7.1.2 & HEREIN	TABLE V & PARA. 4.7.1.2	TABLE V.a	N/A
K412V06PN	TEL	412V-0611	+2.0 6.0V -1.5	70	3.2V	"	"	"	"	"	"	"
K412V12PN	TEL	412V-0612	+4.0 12.0V -3.0	235	6.5V	"	"	"	"	"	"	"
K412V18PN	TEL	412V-0613	+6.0 18.0V -1.5	610	10.0V	"	"	"	"	"	"	"
K412V26PN	TEL	412V-0614	+5.5 26.5V -4.5	1130	13.0V	"	"	"	"	"	"	"

NOTES: 1/ THIS SPECIFICATION, IN CONJUNCTION WITH CS515579, MIL-R-39∅16, AND MIL-R-39∅16/9, IMPOSES ALL REQUIREMENTS FOR PROCUREMENT OF THESE DEVICES.

2/ REFER TO MIL-R-39∅16/9.

3/ REFER TO CS515579.

4/ REFER TO MIL-R-39∅16.

5/ PER MIL-R-39∅16/9 EXCEPT THAT CASE HEIGHT SHALL BE ∅.27∅ INCHES MAX (IN LIEU OF ∅.28∅ INCHES MAX) AND LEAD LENGTH SHALL BE ∅.75 INCHES MIN.

6. THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.

RELEASED THRU SECTION 356 DATA MANAGEMENT: DATE:

REVISION: C APPROVED BY (Section 514): DATE:

APPROVED SOURCE(S)

VENDOR PART NO.	VENDOR	JPL PART NO.
SEE TABLE I (412V SERIES)	TELEDYNE RELAYS HAWTHORNE, CA 9∅15∅ CAGE NO. 11532	SEE TABLE I

The item listed in the approved source block and identified by vendor name, address, and part number will be evaluated and tested by the JPL Electronic Parts Reliability Section or its delegated alternate before being approved for use. Non-JPL users shall check with the Electronic Parts Reliability Section on the status of the part's approval before using.

JET PROPULSION LABORATORY CALIFORNIA INSTITUTE OF TECHNOLOGY CAGE NO. 23835

Procurement Specification: CS515579

Screening Specification: ZPP-2∅73-GEN

Custodian: Electronic Parts Reliability Section 514

TITLE:

RELAY, ELECTROMAGNETIC, DPDT, NON-LATCHING, 1.∅ AMP HIGH VIBRATION, TO-5 CASE

DETAIL SPECIFICATION

ST12117

FILE: (Sec.514): F:\USERS\ JWILSON\WINWORD\ST12117C.DOC

ST12117C REQUIREMENTS:

1. IN-PROCESS INSPECTION SHALL BE PER MIL-R-39∅16 AND CS515579.

2. THE FOLLOWING CHANGES TO CS515579 SHALL APPLY:

3.7 SOLDERABILITY. SECOND SENTENCE TO READ: "THE REMAINING 5 PERCENT OF THE TOTAL CRITICAL AREA SHALL NOT EXHIBIT NONWETTING, DEWETTING, POROSITY OR FOREIGN MATERIAL."

3.11.5 OPERATE AND RELEASE TIME. THIRD SENTENCE TO READ: "DOUBLE THROW CONTACTS SHALL SHOW NO EVIDENCE OF ANY OPEN CONTACT CLOSING BEFORE ALL CLOSED CONTACTS HAVE OPENED."

3.32 CONTROL UNITS. THE LAST SENTENCE TO READ: "THREE CONTROL UNITS SHALL BE USED FOR ANY REQUIRED MEASUREMENTS DURING GROUP A ELECTRICAL TESTS, AND AT COMPLETION OF GROUP A INSPECTION, ALL THREE (3) CONTROL UNITS SHALL BE USED FOR SUBGROUP 1, SUBGROUP 2 AND SUBGROUP 3 PRIOR TO AND AFTER REQUIRED ELECTRICAL MEASUREMENTS."

4.1 RESPONSIBILITY FOR INSPECTION. ADDED POINT (1) TO READ: "IN-PROCESS VISUAL INSPECTION OF MOTOR AND ARMATURE/MAGNET ASSEMBLY ".

4.7.1.2 GROUP A INSPECTION, ADDITIONALLY:

a. IN THE FIRST SENTENCE DELETE: "EXCLUDING DWV" AND "(INCLUDING DWV)".
b. ADD: "THE SEQUENCE OF ELECTRICAL TESTS IN TABLE V IS OPTIONAL.".
c. "THERMAL SHOCK TEST PER 4.8.3.4 SHALL BE PERFORMED JUST PRIOR TO RUN-IN RATHER THAN PRIOR TO SINUSOIDAL VIBRATION."
d. "SHOCK (SPECIFIED PULSE) TEST SHALL BE PERFORMED IN SUBGROUP 2 JUST AFTER SINUSOIDAL VIBRATION AND PRIOR TO PIND, AND SHALL CONSIST OF 3 SHOCK BLOWS: ONE SHOCK BLOW IN EACH OF THREE MUTUALLY PERPENDICULAR AXES."
e. "GROUP A FAILURES MAY BE USED FOR SOLDERABILITY SAMPLES."

TABLE Va. DELTA LIMITS FOR GROUP A INSPECTION, PARAMETER COIL RESISTANCE LIMIT SHALL BE ±5% RATHER THAN ±3%.

4.7.2.1.1 SAMPLING PLAN. ADD: "THE SECOND GROUP B CONTROL UNIT (REF. 3.32) IS TO BE USED IN CONJUNCTION WITH REQUIRED ELECTRICAL MEASUREMENTS OF GROUP B RESISTIVE LOW-LEVEL LIFE TESTS.

ADD "4.8.1.1 INSPECTION PRIOR TO SEALING. BEFORE THE RELAYS ARE SEALED THEY SHALL BE MICROSCOPICALLY EXAMINED FOR WORKMANSHIP. MANUFACTURER SHALL SUBMIT A WRITTEN PROCEDURE FOR REVIEW AND APPROVAL."

4.8.3.2 TABLE VIa. ADD FOLLOWING SINUSOIDAL VIBRATION: "SHOCK (SPECIFIED PULSE) TO THE REQUIREMENTS OF 3.13 AND USING THE TEST METHODS OF 4.8.1∅."

4.8.3.2.2 FAILURE RATE LEVELS "M", "P", AND "R". SENTENCE: "AT THE COMPLETION.." SHALL READ: "AT THE COMPLETION OF RUN-IN, THE STANDARD DEVIATION SHALL BE CALCULATED AT EACH MEASUREMENT POINT." FOR "5 SIGMA" AND "3 SIGMA" READ "±5 SIGMA" AND "±3 SIGMA", RESPECTIVELY.

4.8.3.4 THERMAL SHOCK. DELETE THE SECOND AND THIRD SENTENCES. ADD: "DURING THE TEMPERATURE EXCURSIONS THE RELAY COILS SHALL BE MONITORED FOR CONTINUITY; FAILURE OF COIL CONTINUITY IS CAUSE FOR REJECTION OF THE RELAY."

4.8.7 DIELECTRIC WITHSTANDING VOLTAGE. SHALL READ: "DWV SHALL NOT BE PERFORMED IN 4.8.9 d. EXAMINATION AFTER TEST OF THE THERMAL SHOCK."

4.8.8.1 b. TEST LOAD. TO READ: "1∅ mA MAXIMUM AT 6 V MAXIMUM (DC OR PEAK AC)."

3. SHOCK TEST REQUIRED IN GROUP A, SUBGROUP 2, AND IN TABLE VIa SHALL BE PER MIL-STD-2∅2, METHOD 213, CONDITION A AND MIL-R-39∅16, EXCEPT THE PEAK VALUE SHALL BE 15∅G, 11 MILLISECONDS, 1/2 SINE WAVE. THERE SHALL BE NO CONTACT TRANSFER IN EXCESS OF ONE MICROSECOND AND THE CHATTER OF CLOSED CONTACTS SHALL NOT EXCEED 1∅ MICROSECONDS.

4. CONTACT STABILIZATION TIME SHALL BE 2.5 MILLISECONDS MAXIMUM.

5. SINUSOIDAL VIBRATION SHALL BE IN ACCORDANCE WITH MIL-R-39∅16, MIL-R-39∅16/12, AND THE FOLLOWING:

5.1 SWEEP PROGRAM. UPSWEEP 1∅ TO 2∅∅∅ HZ, 5 ± ∅.25 MINUTES AND RETURN 5 ± ∅.25 MINUTES. IN EACH PLANE, MAKE ONE 5-MINUTE UPSWEEP WITH RELAY IN THE ENERGIZED POSITION AND ONE 5-MINUTE DOWNSWEEP WITH RELAY IN THE DE-ENERGIZED POSITION. GROUP A VIBRATION LEVEL SHALL BE 5∅G PEAK. GROUP B VIBRATION LEVEL SHALL BE 1∅∅ G PEAK.

5.2 CONTACT MONITORING. CONTACT CHATTER SHALL NOT EXCEED TEN (1∅) MICROSECONDS. THERE SHALL BE NO CROSSOVER, CLOSING OF OPEN CONTACTS, IN EXCESS OF ONE MICROSECOND.

6. LEAD MATERIAL SHALL BE COBALT-NICKEL-IRON ALLOY, GOLD PLATED WITH UNDERPLATING ALLOWED.

7. THIS STANDARD TAKES PRECEDENCE OVER DOCUMENTS REFERENCED HEREIN.

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